



DRAFT STAFF ANALYSIS

FOR THE CALPINE CORPORATION'S PETITION TO AMEND THE COMMISSION DECISION FOR THE

LOS MEDANOS ENERGY CENTER PROJECT (98-AFC-1C)

On May 4, 2000, the California Energy Commission (Commission) received a petition from the Calpine Corporation, owner/operator of the Los Medanos Energy Center Project, to amend Commission Decision 98-AFC-1.

The petition contains a proposal by Calpine to maximize the generating capability of the project and add reliability to steam and power production. If approved, the equipment modifications would allow full utilization of the steam turbine generator during peak power demand periods and would enhance the facility's operational characteristics during emergencies. Specifically, the amendment proposes to make the following changes:

- Increase combustion turbine and heat recovery steam generator duct burner fuel consumption limits
- Revise and increase air emission limits consistent with new fuel consumption limits
- Reduce the combustion turbine startup/shutdown emission rates
- Increase the size of the duct burners from 83 to 300 million British Thermal Unit per hour (MMBtu/Hr)
- Increase the size of the auxiliary boiler from 266 to 320 MMBtu/Hr
- Add a 600 kilowatt natural gas-fired emergency generator and a diesel fuel fire pump
- Revise air emission offset requirement to reflex the new emission limits

Additionally, the amendment proposes to add a diesel-fired fire pump and a natural gas-fired emergency generator. The fire pump is a combination of a water pump driven by a diesel-fired engine and will be tested weekly for up to one hour to ensure operability. Other than the weekly testing, the fire pump engine will only be used for emergency fire protection and is expected to operate approximately 100 hours per year. The fire pump will provide the plant operators with the onsite fire protection capability required for insurance purposes.

The emergency generator is a 600-kilowatt unit fired on natural gas. It will provide the plant operators with sufficient power to shutdown the facility in a controlled manner in the event of the loss of electrical connection (i.e. loss of electrical power and the trip of the combustion turbines). The generator will also be operated for up to one hour weekly to ensure operability and up to 200 hours per year.

SUMMARY OF DRAFT STAFF ANALYSIS

Generating Capacity

The original Application for Certification (AFC) described, and the Commission Decision permitted, a power plant that will generate a nominal 500 MW. All Commission power plant decisions refer to nominal capacity because generating capacity can only be estimated prior to operation. It is only when fully operational, that generating capacity can be measured.

The amendment request proposes several changes to the conditions of certification, the foremost of which, is equipment modifications (an increase in the size of the duct burners) which would increase generating capacity. In general, nominal capacity is based on manufacturer's representations. A more precise generating capacity can be estimated when location (altitude, temperature, humidity), the incorporation of cogeneration, the employment of auxiliary firing, etc., are also included. This analysis included these calculations. Generating capacity of the Los Medanos Energy Center, as currently permitted without the larger duct burners, is approximately 530 MW (at average temperatures) and 546 (based on maximum power output).

The Power plant siting regulations specify that equipment modifications which result in an increase in capacity of 50 MW or greater, trigger a new AFC process. The focus of this Commission staff analysis is the **incremental** increase in output. Commission staff concludes that the proposed equipment modifications would result in an **incremental generating capacity increase of approximately 29 MW or 17 MW depending on ambient air conditions**, and that a new AFC procedure is not required.

Air Quality

The proposed equipment modifications would result in increased emissions. The Bay Area Air Quality Management District (District) has reviewed the amendment request and has issued a draft regulatory analysis for the proposed changes to the air permit conditions. The District's draft analysis is favorable to the changes with the condition that Calpine provide additional offsets to comply with District rules and regulations. Calpine owns sufficient emission reduction credits (generated from emission reductions at an Antioch facility) to satisfy this requirement.

Public Health

The proposed changes in project operation would not significantly impact public health for either acute or chronic noncancer health effects or for cancer. All potential health effects are well below levels considered significant by staff. This conclusion also applies to the proposed addition of emergency equipment on site.

The full text of the analysis follows.

<u>Technical Area</u>	<u>Page</u>
§ Generating Capacity	4
§ Air Quality	7
§ Public Health	19

FURTHER INFORMATION

Persons who have technical questions regarding the analysis may contact Jeri Scott, Compliance Project Manager, by telephone at (916) 654-4228 or by e-mail at jscott@energy.state.ca.us.

If you wish to submit written comments concerning the enclosed staff analysis, your comments must be received no later than December 15, 2000.

GENERATING CAPACITY

Steve Baker

INTRODUCTION

The Los Medanos Energy Center Amendment request proposes to increase the firing capacity of the HRSG duct burners from 83°MMBtu/hr (HHV)¹ to 333 MMBtu/hr (HHV).

Calpine seeks approval to increase the size, and firing capacity, of the duct burners in the two Heat Recovery Steam Generators (HRSGs) in order to correct an engineering error made by the project's original proponent, Enron (Calpine letter to Jeri Scott, Response to Data Requests, dated July 13, 2000; Response 1). The original design neglected to provide sufficient steam for feedwater deaeration; larger duct burners are required to produce sufficient steam.

The original Application for Certification (AFC) described, and the Commission Decision permitted, a power plant that will generate a nominal 500 MW. All Commission power plant decisions refer to nominal capacity because generating capacity can only be estimated prior to operation. It is only when fully operational, that generating capacity can be measured. The focus of staff's generating capacity analysis was to determine if the incremental increase in capacity would be 50 MW or more. The analysis concludes that the proposed equipment modifications will result in an incremental generating capacity increase of approximately 29 MW, and that therefore, a new AFC procedure is not required.

In the case of Los Medanos, generating capacity at annual average ambient conditions² is expected to be 530 MW net (without incorporation of this amendment) (Data Response Number 8, August 21, 2000). Incorporation of the amendment would increase generating capacity by 29°MW at these conditions, to a total of 559 MW net. (These figures increase to 546 MW and 563 MW at 40°F, the temperature at which power output is at a maximum.) See Table 1, below.

APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following LORS affect the proposed changes to the project:

¹ MMBtu/hr is millions of Btu per hour; HHV is higher heating value.

² Annual average ambient conditions are those at which Energy Commission staff evaluate the generating capacity of a power plant for purposes of determining Commission siting jurisdiction, per regulation (Cal. Code Regs., tit. 20, /2003). Annual average temperature at the site is 64°F.

In describing the siting jurisdiction of the Energy Commission, the Warren-Alquist Act defines Modification of an existing facility as any alteration that results in a 50-megawatt or more increase in the electric generating capacity of an existing thermal power plant (Pub. Resources Code, /25123). Siting regulations specify how generating capacity shall be calculated for purposes of determining siting jurisdiction (Cal. Code Regs., tit. 20,/2003).

ANALYSIS

The original AFC described, and the Commission Decision permitted, a power plant that will generate a nominal 500 MW. As with any power plant project, this nominal generating capacity is only an estimate, based on preliminary design information and generating equipment manufacturers guarantees. The project s actual generating capacity will differ from, and typically exceed, this number.

In response to the question regarding generating capacity, Calpine provided Data Response Number 8 (dated August 21, 2000), which includes detailed calculations of plant generating capacity. Calpine calculates generating capacity at both average ambient conditions and maximum output conditions (40°F), with and without the larger duct burners. The results of the calculations are:

LMEC Net Generating Capacity

	As Certified	With Amendment	Incremental Increase
At 64°F (average annual ambient)	530 MW	559 MW	29 MW
At 40°F (maximum power output)	546 MW	563 MW	17 MW

I have examined Calpine s calculations and find them to be properly executed. Note that any determination of generating capacity at this time must rely on calculations. Only after the LMEC is completed and in operation can its actual generating capacity be determined by examining the output meter. In fact, determining plant-generating capacity is one of the steps that must be completed before the turbine vendor can release the plant to the owner. This number should show that the plant produces at least the guaranteed minimum power output; typically, actual output will be slightly higher.

Note that any environmental impacts from this amendment will be related to air emissions. Please refer to Air Quality staff s analysis for their recommendations pertaining to this amendment.

MITIGATION MEASURES AND CONDITIONS

No mitigation measures are required regarding generating capacity. No conditions of certification are required.

CONCLUSIONS

The increase in generating capacity due to modifications performed under the proposed amendment will be less than 50 MW and no new AFC is required.

AIR QUALITY

Guido Franco

INTRODUCTION

The California Energy Commission issued a license for the Pittsburg District Energy Facility (PDEF) on August 17, 1999. Calpine Construction Finance Company (CCFC) purchased PDEF from its original owner and renamed the facility Los Medanos Energy Center (LMEC). On May 4, 2000 CCFC submitted an Amendment Request. This amendment request proposes several changes to the conditions of certification but the major changes include a significant increase in the size of the duct burner located in the heat recovery steam generator.

The Bay Area Air Quality Management District (District) has reviewed the amendment request and has issued a draft regulatory analysis for the proposed changes to the permit conditions. The draft analysis is favorable to the changes with the condition that CCFC provides additional offsets to comply with District's rules and regulations. CCFC owns sufficient emission reduction credits (ERCs), which were generated from emission reductions in Antioch, to satisfy this requirement.

This document briefly summarizes the requested changes, the regulatory analysis prepared by District, and expands the air quality impact analysis. This document ends with Staff's recommendations with respect to the proposed changes.

PROPOSED CHANGES

CCFC is requesting the following air quality related changes to the Conditions of Certification:

- Change of the name in the Conditions from Pittsburg District Energy Facility (PDEF) to Los Medanos Energy Center (LMEC);
- Increase the heat input of each Heat Recovery Steam Generator (HRSG) duct burner from 83 million British Thermal Units (MMBtu) expressed in their highest calorific value (HHV) to 333 MMBtu (HHV). This translates in an increase in the amount of fuel that can be consumed at this facility;
- Increase the heat input of the auxiliary boiler from 266 MMBtu (HHV) to 320 MMBtu (HHV);
- Require a selective catalytic reduction (SCR) control system in the auxiliary boiler for oxides of nitrogen (NO_x) control;
- Add a 600 KW (300 hp) fire pump diesel engine;
- Add a 600 KW natural gas fired emergency generator;

- Change permitted NO_x, carbon monoxide (CO), and precursor organic compounds (POC) emission rates during start-up conditions;
- Decrease considerably permitted NO_x, CO, and POC emission levels during shutdown conditions;
- Revise allowable mass emission rates for CO, NO_x, POC, PM10, and sulfur oxides (SO_x) to be compatible with the proposed increases in heat input rates;
- Increase the allowable total dissolved solid (TDS) concentration in water used in the cooling tower.
- Increase allowable emissions during Commissioning, i.e. the operation that starts with the first firing of a major system in the power plant to the beginning of commercial operation.

The following Table summarizes the proposed changes in emission limits for each one of the power trains (gas turbine and HRSG).

AIR QUALITY Table 1
Proposed Changes in Permitted Levels: Gas Turbine and HRSG

Pollutant	Existing Limits	Proposed Limits
NO _x		
Start-up (lb/hr)	223	240*
Shutdown (lb/hr)	58	20*
CT/HRSG (lb/hr)	17.5	20.0
CO		
Start-up (lb/hr)	1821	2,514*
Shutdown (lb/hr)	238	44.1*
CT/HRSG (lb/hr)	26.56	29.2
PM10		
CT (lb/hr)	16.3	13
CT/HRSG (lb/hr)	17	16.3
POC		
Start-up (lb/hr)	239	48*
Shutdown (lb/hr)	253	8*
CT/HRSG (lb/hr)	3.4	3.8
SO _x		
CT/HRSG (lb/hr)	5.6**	6.2***
<p>* These limits are per start-up or shutdown sequence. CEC staff assumed in the air quality modeling analysis that since there would not be emission limits on an hourly basis that all the emissions would occur during one hour (worst case assumption).</p> <p>** It was enforced by a maximum sulfur content of the fuel of 1 grain per 100 standard cubic feet</p> <p>***It would be enforced by an annual source test</p>		

The following table summarizes the changes in emissions levels for the auxiliary boiler.

AIR QUALITY Table 2
Proposed Changes in Emission Levels: Auxiliary Boiler

Pollutant	Existing Limits	Proposed Limits
NO _x (lb/hr)	2.9	3.5
CO (lb/hr)	9.8	11.8
PM10 (lb/hr)	1.33*	1.6
POC (lb/hr)	0.36	0.36
SO _x (lb/hr)	**	0.5***
<p>* The existing conditions do not have hourly emission limits. Only daily limits were included in the original COC because there are not hourly ambient air quality standards for PM10</p> <p>** Emissions were limited by maximum sulfur content of the fuel of 1 grain per 100 standard cubic feet, which would be slightly lower than 0.5 lb/hr</p> <p>***It would be enforced by an annual source test</p>		

The following Table presents the proposed daily and annual emission changes on a facility-wide basis. These limits also apply on days when start-up and shutdown events occur. These emissions do not include the emissions from sources not requiring permits from the District, i.e. emergency generator and fire pump.

AIR QUALITY Table 3
Proposed Changes in Daily and Annual Emission Levels: Facility-wide basis

Pollutant	Existing Limit	Proposed Limit
NO _x (lb/day)	1,190	1,342
NO _x (tpy)	153.2	175.7
CO (lb/day)	5,224	6,445
CO (tpy)	487.5	506.4
POC (lb/day)	892	271.3
POC (tpy)	97.6	33.9
PM10 (lb/day)	842	742
PM10 (tpy)	123.6	131.6
SO _x (lb/day)	272	282.6
SO _x (tpy)	39.9	47.1

As expected the emissions from the non-permitted sources do not represent a significant source of emissions. However, the air quality impact analysis does include an evaluation of the air quality impacts from these sources. On an annual basis their emissions represent a fraction of one ton per year (Table 2-3. Calpine, 2000).

The following table summarizes the proposed changes for the Commissioning period. This table only reports changes in permitted levels to emphasize these changes.

AIR QUALITY Table 4
Proposed Changes During Commissioning

Pollutant	Gas Turbine/HRSG		Auxiliary Boilers	
	Existing Limits	Proposed Limits	Existing Limits	Proposed Limits
NO _x Lb/hr	1,360	3,511	2.91	21
Lb/day			69.8	268
CO Lb/hr	6,800	10,848	9.74	14
Lb/day				
POC Lb/day			8.64	16
PM10 Lb/day			31	60
SO _x Lb/day			3.6	8

The Condition of Certification (COC) AQ-52 is one of the permit conditions not included in the District's Permit to Construct. This condition limits the amount of total dissolved solids (TDS) to a maximum of 2550 mg/l. The District's June 16, 2000 analysis includes a calculation showing new estimation for TDS equal to 3765 mg/l. This increase results in total worst-case PM10 emissions of 4.57 tons/year. As indicated in the Staff Assessment for this project, PM10 emission calculations are severely overstated due to the assumption that all the solids in the droplets leaving the cooling towers are immediately released as PM10. In reality, these droplets are much larger than 10 microns; most of them will tend to deposit close to the cooling towers before they become smaller than 10 microns (PM10); and the water in the droplets will not evaporate under high humidity conditions. Historically, most of the highest PM10 concentrations are measured during the wintertime when these high humidity conditions occur.

Most of the changes of permit conditions not related to the increases in heat input rates (the ability to burn more fuel) are a result of a desire by CCFC to have similar permit conditions for both of the plants that it owns in Contra Costa County, i.e. Delta Energy Center and LMEC. The original applicant for LMEC used very conservative emission factors, which were in most cases higher than the emission factors used for Delta.

SUMMARY OF THE REGULATORY ANALYSIS

Section 1769(a)(1)(F) of the CEC Siting Regulations requires a discussion of the facility's ability to comply with applicable laws, ordinances, regulations, and standards

(LORS). CEC Staff has performed this analysis mainly through close collaboration with the District. The District released a draft regulatory analysis (BAAQMD, 2000). The analysis concludes that the proposed modifications would comply with District's rules and regulations as long as CCFC provides the additional regulatory offsets identified in the analysis. The analysis includes a revised Prevention of Significant Deterioration (PSD) review. The U.S. EPA has delegated the implementation of this federal program to the District. Attachment A includes a regulatory analysis prepared by District. Please refer to this document for a complete discussion on this subject.

Table 24 in the draft regulatory analysis prepared by the District presents the amount of offsets required for this amendment. This Table is reproduced, with modifications, below.

AIR QUALITY Table 5
Summary of the Offsets Requirement Calculations

	NO _x	CO	POC	PM ₁₀	SO ₂
Calculated Facility Emissions (ton/yr)	175.64	507.36	33.8	131.6	47.11
Facility Permit Limits (ton/yr)	175.7	506.4	33.9	131.6	47.11
Offsets Required	Yes	No	Yes	Yes	No
Offset Ratio	1.15:1.0	N/A	1.0:1.0	1.0:1.0	N/A
Offsets Required (tons)	202.06	0	33.9	131.6	0
Offsets Surrendered (tons)	176.18	0	112.25	98.13	101.68*
Outstanding Offsets Balance	25.88	N/A	-78.35	8.05*	N/A
Certificate 660	39.55				5.92
Certificate 559					30.40
Final Balance	-13.67	N/A	-78.4	-1.0**	N/A
* Balance is calculated as follows 131.6 - 98.13 — 101.68/4. Please note that 101.68 tons of SQ offsets generate 25.42 tons of PM10 offset (a 4 to 1 conversion ratio) ** Again, the final balance is calculated as follows: 8.05 — (5.92+30.4)/4 using a 4 to 1 inter-pollutant ratio. Notes: the minus sign indicates that more ERCs are available than needed. N/A means not applicable.					

CCFC owns banking Certificates 659 and 660. Both certificates were generated from the shutdown of an Owens-Brockway glass plant located in Antioch. Certificate 660 is for 39.55 tpy and 5.92 tpy of NO_x and SO_x, respectively. Certificate 659 is for 30.4 tpy of SO_x. CCFC will use both certificates to offset the NO_x and PM10 emission increases due to the proposed amendments. In the case of PM10, CCFC will use 32.2 tons of SO_x to offset the 8.05 ton increase in PM10 emissions (an interpollutant ratio of 4 to 1).

AIR QUALITY IMPACT ANALYSIS

Section 1769 (a) (1) (E) of the CEC Siting Regulations requires the Commission to analyze the impacts that the proposed changes may have on the environment and to proposed mitigation measures to address significant adverse impacts, if needed.

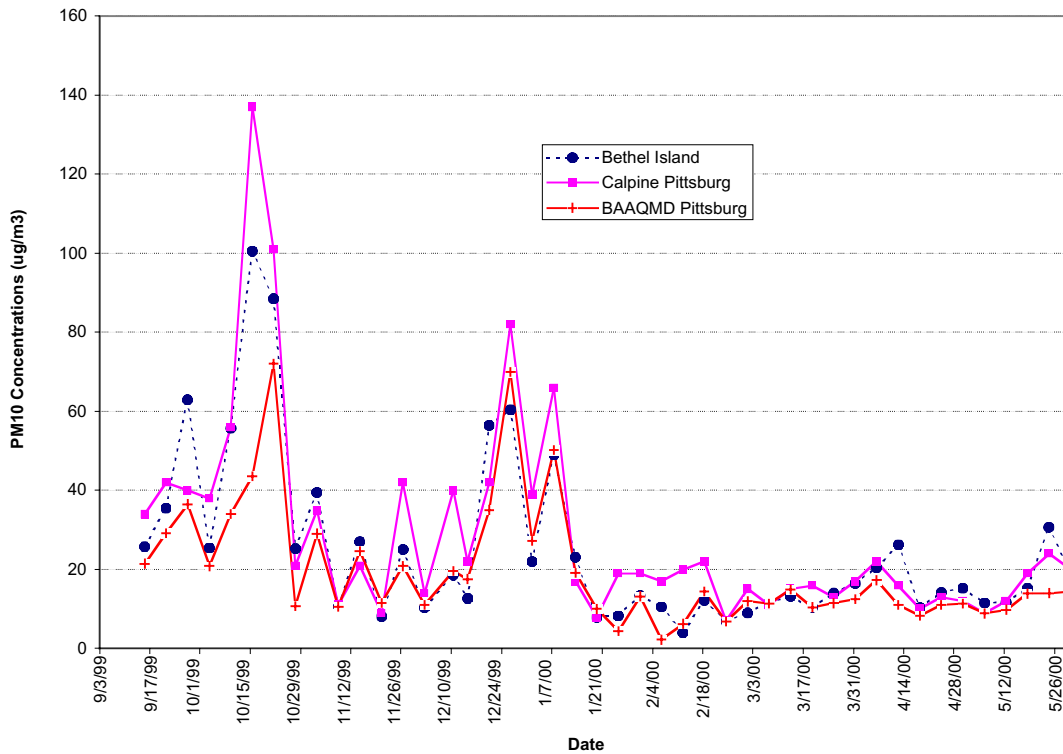
Condition of Certification AQ-58 required the project owner to install a PM10/PM2.5 air quality monitoring station in the Pittsburg-Antioch area. The Intervenor for the project argued that the existing monitoring stations did not adequately capture ambient air quality conditions in the Pittsburg/Antioch area. These monitors, supported by the District, are located in 10th Street in Pittsburg and on Bethel Island. Since the Calpine Pittsburg monitoring station required by Condition AQ-58 has already collected particulate matter (PM) data, it is necessary to consider these data to establish the PM background concentrations in the area. In the following paragraphs, we first present a discussion of the data collected at this monitoring station before presenting a discussion regarding estimated worst-case air quality impacts.

The Calpine Pittsburg air quality monitoring station started collecting data on September 15, 1999. District provided us with ambient air quality data from their Pittsburg 10th Street and Bethel Island monitoring stations from September 1999 to May 2000. For this reason we compare data from the Calpine Pittsburg and the District's stations from September 1999 to May 2000.

It is important to know that the Calpine Pittsburg monitoring station was initially located at a parking lot at the Antioch fairgrounds. This area was not paved and from a simple visual inspection it was clear that the unpaved parking lot was a potential source of fugitive dust. The District ordered CCFC to move the monitor to a different location because the site should not be considered representative of the PM conditions in the Pittsburg-Antioch area due to its location with respect to a localized source of fugitive dust. District had used this site in the past to measure air toxic contaminants, which would not be affected by the dust. The relocated monitoring station started operation at the Antioch Historical Society (4th Street) on March 24, 2000.

The following figure shows the PM10 air quality data collected in the Calpine Pittsburg monitoring station, Bethel Island, and the Pittsburg station on 10th street (BAAQMD Pittsburg).

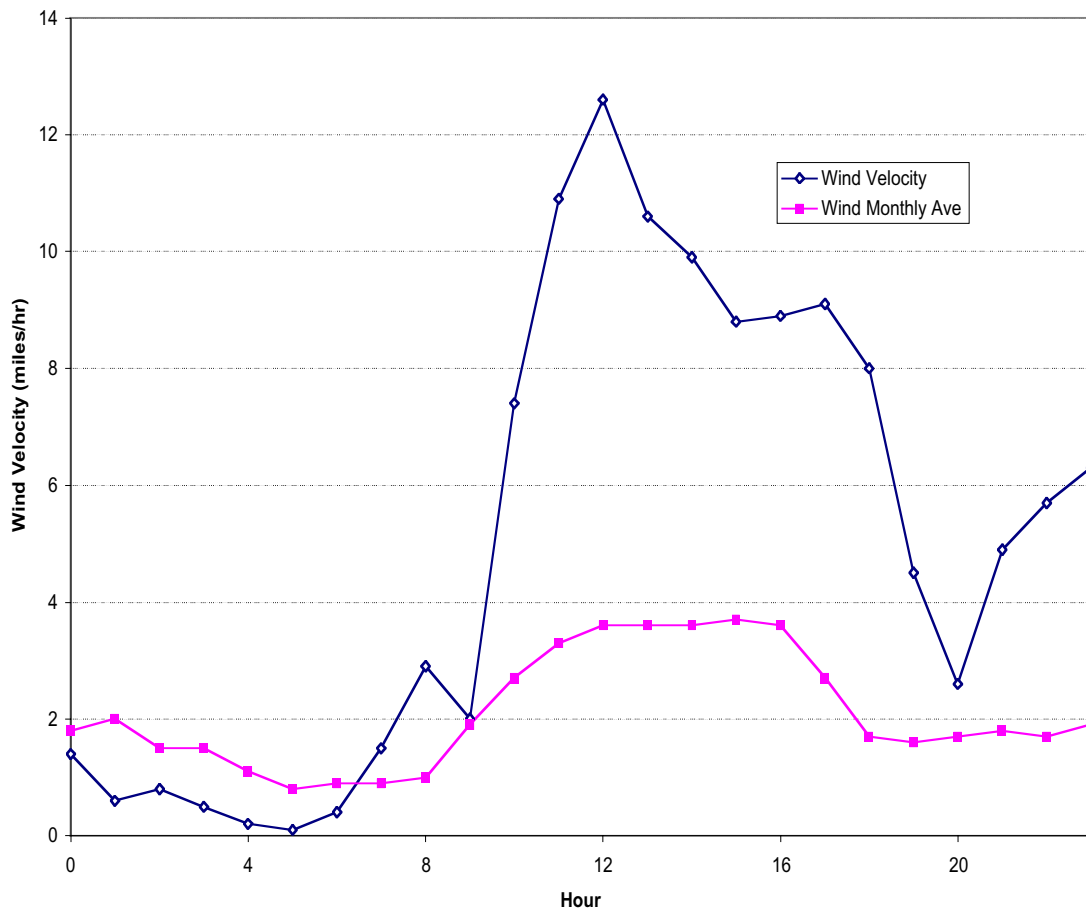
AIR QUALITY Figure 1
Ambient PM₁₀ Air Quality Data: September 1999 to May 2000



The only day when the PM₁₀ concentration measured by Calpine Pittsburg was significantly higher than the measurements at the other monitoring stations was October 15, 1999. For all the other days, it seems that the Pittsburg and Bethel Island monitoring station provided a very good representation of the air quality conditions in the Pittsburg-Antioch area. In fact, the historical record shows that the Bethel Island site is more influenced by the conditions in the interior valleys and usually has the highest measured concentration in Contra Costa County.

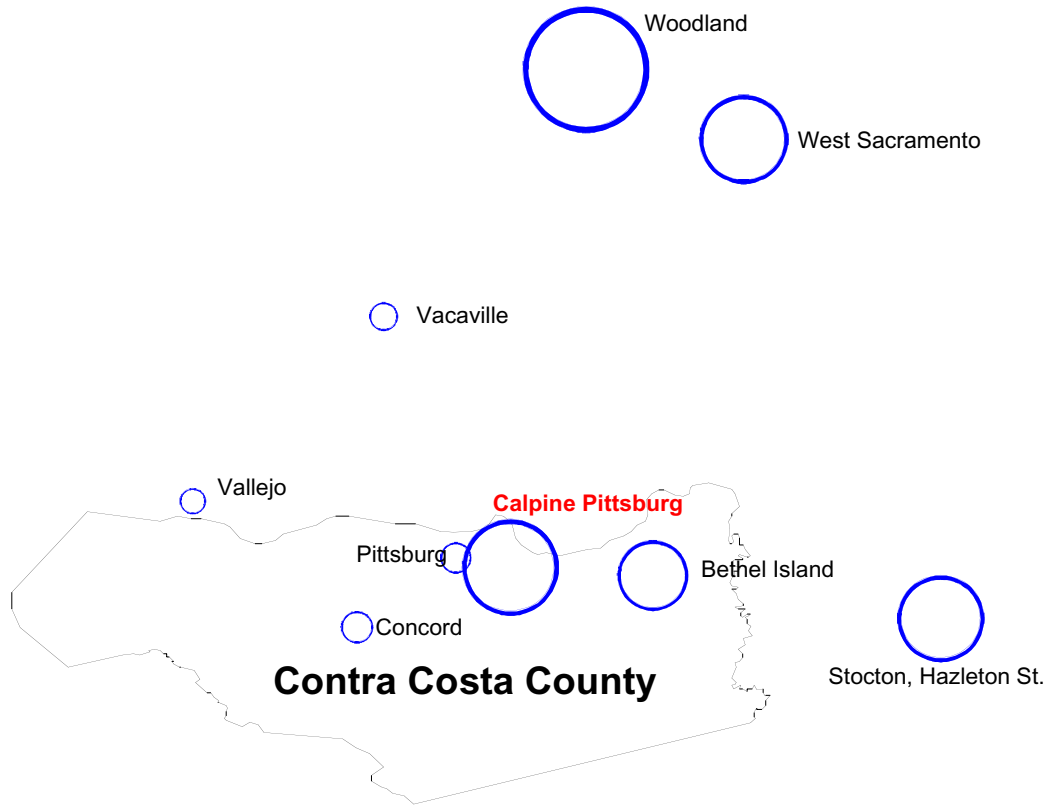
An investigation into the cause of the high PM₁₀ concentration on October 15, 2000 indicates that PM_{2.5} (particles less than 2.5 microns) concentration (24-hour average) was 19 $\mu\text{g}/\text{m}^3$, which is much lower than the 137 $\mu\text{g}/\text{m}^3$ measured at the Calpine Pittsburg monitoring station. In addition, the PM_{2.5} concentrations were in the same order than the measured levels during other days in October 1999. This suggested that most of the high PM₁₀ concentration was due to fugitive dust originating from the parking lot. If this is the case, we should expect relatively high wind conditions, which are needed to entrain the dust in the absence of other disturbing factors. As shown in the next figure, wind conditions in the Pittsburg area were much higher than the monthly averaged wind conditions during the same month confirming the hypothesis that the high PM₁₀ concentrations must have originated from the wind picking up dust.

AIR QUALITY Figure 2
Wind Velocities: October 15, 1999 and Monthly Average for October



As indicated before, relatively high winds entrain dust and can result in local high PM₁₀ concentrations at the source of dust or close to the source, e.g., unpaved parking lot, uncultivated areas, and agricultural operations. However, PM₁₀ concentrations usually drop significantly after about 100 meters away from the source of suspended dust. A graph showing the ambient PM₁₀ concentrations measured in monitoring stations in Contra Costa County and some surrounding counties confirm the sketchy nature of the distribution. Only monitoring stations **traditionally impacted by fugitive dust** experienced high PM₁₀ concentrations.

AIR QUALITY Figure 3
Geographical Distribution of PM₁₀ Concentrations
October 15, 1999



In the above Figure, the sizes of the circles are proportional to the measured ambient PM₁₀ air quality concentrations on October 15, 2000 and their centers are located approximately at the locations of their respective monitoring stations.

For all the above reasons, we conclude that the existing BAAQMD Pittsburg and Bethel Island stations provide a very good representation of the ambient air quality conditions in the Pittsburg-Antioch area. Therefore, an analysis done using data from these stations to estimate background concentrations is adequate.

The following Table summarizes the estimated air quality impacts from LMEC including all the proposed changes. We only address pollutants with a potential for significant impacts. We do not include SO₂ and CO impacts. SO₂ impacts are extremely low and the background concentrations are relatively low with respect to the relevant ambient air quality standards. Carbon monoxide impacts should be negligible because the maximum allowed concentration in the stacks (6 ppmv) is much lower than the ambient air quality standard of 20 ppmv.

AIR QUALITY Table 6
Air Quality Impacts ($\mu\text{g}/\text{m}^3$)

Pollutant	Averaging Time	Maximum Impacts	Maximum Background Concentrations*	Total Impacts	Most Stringent Standard
NO ₂	1-hour annual	235** 0.7	164*** 34	399 34.7	470 100
PM10	24-hour annual	4.4 0.8	101**** 23.3	105.4 24.1	50 30
<p>* Highest monitored concentrations from Pittsburg and Bethel Island monitoring stations from 1995 to 1997.</p> <p>** Impacts calculated during start-up conditions. Under normal operating conditions the impacts are lower than 20 $\mu\text{g}/\text{m}^3$.</p> <p>*** Pittsburg 10th Street monitoring station (1999)</p> <p>****Measurement taken in Bethel Island in 1999 (October 15, 2000)</p> <p>Source: Table III of the Summary of Air Quality Impact Analysis for the Los Medanos Energy Center prepared by BAAQMD (see Attachment A).</p>					

The NO₂ maximum background concentrations measured in Pittsburg and Bethel Island from 1995 to 1997 should conservatively represent the worst-case impacts since the maximum impacts for NO₂ went down in subsequent years. The PM10 impact of 4.4 $\mu\text{g}/\text{m}^3$ is the highest second- high concentration estimated by modeling, which is estimated by calculating the second highest concentrations for each one of the receptors used in the modeling analysis, and then, selecting the highest from all of them. Regulations do allow the use of highest second highest impacts to estimate PM10 impacts. The highest overall impact is about 5.8 $\mu\text{g}/\text{m}^3$. However, it is important to understand that both the 4.4 $\mu\text{g}/\text{m}^3$ and 5.8 $\mu\text{g}/\text{m}^3$ impacts are mostly the results of overstated PM10 impacts from the cooling tower. Actual impacts are expected to be significantly lower than 4.4 $\mu\text{g}/\text{m}^3$.

The estimated worst-case impacts are the highest estimated impacts from commissioning, start-up and shutdown conditions, and normal operation modes. The worst-case impacts for different pollutants do not necessarily occur during the same operating conditions. They also include estimated impacts from the auxiliary boiler, emergency generator, and fire pump. As indicated before, since the new start-up conditions do not limit hourly emissions but limit the total amount of emissions per start-up sequence, we assumed the worst-case scenario, which is that all the emissions occur during the first hour in the start-up sequence.

ADEQUACY OF THE PROPOSED MITIGATION

The additional regulatory offsets required by the District can be seen as mitigation for this project. These offsets will mitigate any potential increase in emissions from a regulatory standpoint. The reduction in permitted emission rates for the gas turbine/HRSG could also be seen as mitigation, e.g., PM10 emissions from the gas turbine are now limited to 13 lb/hr instead of the 16.3 lb/hr assumed in the original analysis for this project. However, the reduced emission rates mainly reflect the willingness by CCFC of accepting less conservative emission rates as permit conditions, they do not reflect an actual reduction in emission rates for the LMEC.

Had CCFC used the same assumptions used in the original application, the amount of required offsets would have been greater than the amount of offsets required by the District for this amendment. For this reason, there is a net reduction of excess offsets with this amendment.

We believe that the project with the required offsets is fully mitigated from a regulatory and from an environmental perspective. However, we recognize that the level of excess mitigation has been reduced.

CONCLUSIONS AND RECOMMENDATIONS

The conclusions of our analysis are that:

- The amendments to permit conditions, if granted, will not result in unmitigated significant adverse impacts;
- The amendments to permit conditions will not interfere with compliance with applicable air quality laws, ordinances, regulations, and standards as long as CCFC provide the offsets required by the District.

CEC Staff recommends that the Commission accept the proposed changes to permit conditions as presented in Attachment A. [The CEC Conditions of Certification included more conditions than the conditions adopted by the District. One of these conditions is AQ-58, which requires the operation of the air quality monitoring station for some time after the LMEC enters into operation. All these CEC only conditions will remain unchanged with the exception of an increase in the allowable total dissolved content \(TDS\) in the cooling tower.](#)

REFERENCES

BAAQMD, 2000. Permit Evaluation and Emission Calculation. Los Medanos Energy Center; Plant #11866. November.

Calpine, 2000. Los Medanos Energy Center License Amendment #3 for 98-AFC-1. Prepared for Calpine Construction Finance Company. May.

Matthews, N., 2000a. Letter to Ellen Garvey dated August 2, 2000.

Mathews. N., 2000b. Memorandum to Guido Franco dated August 14, 2000.

Radian, 2000. Quality Assurance Plan. Calpine Delta Projects (CDP). Air Quality Monitoring. June 26.

PUBLIC HEALTH

Mike Ringer

INTRODUCTION

Calpine Construction Finance Company is requesting several changes to the proposed design of the Los Medanos Energy Center (formerly Pittsburg District Energy Facility). The proposed project modifications would change emission rates, thereby affecting the levels of non-criteria pollutants emitted by the project. Different emission rates could result in changes to previously estimated public health impacts.

This analysis examines the long-term (cancer and non-cancer) and short-term health impacts of the proposed changes.

APPLICABLE LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

The following LORS affect the proposed changes to the project:

CALIFORNIA HEALTH AND SAFETY CODE SECTION 41700

This section states that no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.

BAY AREA AIR QUALITY MANAGEMENT DISTRICT RULE 2-1-316

This rule requires a risk assessment or risk screening analysis to be performed for new or modified facilities that emit one or more toxic air contaminants that exceed specified amounts.

ANALYSIS

Calpine proposes to make the following changes to the Authority to Construct from the Bay Area Air Quality Management District for the Los Medanos Energy Center:

- Increase combustion turbine and heat recovery steam generator duct burner fuel consumption limits,
- Reduce the combustion turbine startup/shutdown emission rates,
- Increase the size of the duct burners, and
- Add a 600 kilowatt natural gas fired emergency generator and a diesel fuel fire pump.

These changes to the gas turbines and duct burners would result in increased fuel consumption with an associated increase in emissions, higher hourly emissions based on identification of a new operating mode, and lower emission rates during startup. In addition, proposed new emergency equipment would result in additional emissions.

In order to determine the significance of potential health impacts associated with the proposed changes, health risk assessments were performed for the combined cycle portion of the facility and separately for the diesel fire pump engine.

Public Health Table 1 presents the results of the health risk assessment for the facility. As shown, noncancer hazards for both acute (short-term) and chronic (long-term) health impacts are well below the significance level of 1.0 for the proposed changes. The cancer risk for the cooling towers and gas turbines was recalculated to reflect the fact that one of the toxic substances included in the original calculations, hexavalent chromium, is not expected to be emitted from the cooling towers. The revised calculations show that the worst-case cancer risk is 0.13 chances in one million, or substantially less than the de minimus level of one in one million.

Public Health Table 2 presents the health risk assessment results for the diesel fire pump engine. The modeling analysis conservatively assumed that testing would take one hour weekly, although the duration of the test is expected to be only 30 minutes. Noncancer hazards for acute and chronic health impacts are less than one percent of the significance level, while cancer risk at the nearest residence is 0.2, well below the de minimus level.

**Public Health Table 1
Facility Hazard/Risk**

Type of Hazard/Risk	Current	Proposed	Significance / de minimus Level
ACUTE NONCANCER HAZARD	0.04	0.08	1.0
CHRONIC NONCANCER HAZARD	0.018	0.010	1.0
CANCER RISK	0.50×10^{-6}	0.13×10^{-6}	1.0×10^{-6}

Source: AFC Supplement Table 5.16-1S, p. 5.16-3, revised 3/99 HRA results, LMEC License Amendment #3, 10/27/2000 letter from N. Matthews, Sierra Research to D. Jang, BAAQMD.

**Public Health Table 2
Diesel Fire Pump Engine Hazard/Risk**

Type of Hazard/Risk	Proposed	Significance / de minimus Level
ACUTE NONCANCER HAZARD	less than 0.01	1.0
CHRONIC NONCANCER HAZARD	less than 0.01	1.0
CANCER RISK	0.20×10^{-6}	1.0×10^{-6}

Source: LMEC License Amendment #3

CONCLUSIONS AND RECOMMENDATIONS

The proposed changes in project operation would not significantly impact public health for either acute or chronic noncancer health effects or for cancer. All potential health effects are well below levels considered significant by staff. This conclusion also applies to the proposed addition of emergency equipment on site.

Staff recommends approval of the proposed changes.

MITIGATION MEASURES AND CONDITIONS

Since all potential impacts are below levels of significance, staff does not recommend any mitigation measures or additional conditions of certification.